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10/801,475	03/16/2004	Hsien-Wei Chen	24061.193 (TSMC2003.1410)	1783
42717 7590 04/05/2007 HAYNES AND BOONE, LLP 901 MAIN STREET, SUITE 3100 DALLAS, TX 75202			EXAMINER LEWIS, MONICA	
			ART UNIT	PAPER NUMBER
			2822	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		04/05/2007	PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

# Office Action Summary

Application No.

10/801,475

Applicant(s)

CHEN ET AL.

Examiner

Monica Lewis

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 20 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-14, 19 and 20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13, 19 and 20 is/are rejected.
- 7) ☒ Claim(s) 14 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

1. This office action is in response to the interview with Zandra Smith on February 7, 2007.
2. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

#### ***Election/Restrictions***

3. Applicant's arguments in regards to the restriction requirement of 9/12/05 were found persuasive in the interview with Zandra Smith. Therefore, claims 1-14, 19 and 20 will be examined.

#### ***Specification***

4. The title of the invention is not **descriptive**. A new title is required that is clearly indicative of the invention to which the claims are directed.
5. The disclosure is objected to because of the following informalities: a) there is no "Brief Summary of the Invention."

Appropriate correction is required.

#### **Content of Specification**

- (a) Title of the Invention: See 37 CFR 1.72(a) and MPEP § 606. The title of the invention should be placed at the top of the first page of the specification unless the title is provided in an application data sheet. The title of the invention should be brief but technically accurate and descriptive, preferably from two to seven words may not contain more than 500 characters.
- (b) Cross-References to Related Applications: See 37 CFR 1.78 and MPEP § 201.11.
- (c) Statement Regarding Federally Sponsored Research and Development: See MPEP § 310.
- (d) The Names Of The Parties To A Joint Research Agreement: See 37 CFR 1.71(g).

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- (e) Incorporation-By-Reference Of Material Submitted On a Compact Disc: The specification is required to include an incorporation-by-reference of electronic documents that are to become part of the permanent United States Patent and Trademark Office records in the file of a patent application. See 37 CFR 1.52(e) and MPEP § 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text were permitted as electronic documents on compact discs beginning on September 8, 2000.
- Or alternatively, Reference to a "Microfiche Appendix": See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.
- (f) Background of the Invention: See MPEP § 608.01(c). The specification should set forth the Background of the Invention in two parts:
- (1) Field of the Invention: A statement of the field of art to which the invention pertains. This statement may include a paraphrasing of the applicable U.S. patent classification definitions of the subject matter of the claimed invention. This item may also be titled "Technical Field."
  - (2) Description of the Related Art including information disclosed under 37 CFR 1.97 and 37 CFR 1.98: A description of the related art known to the applicant and including, if applicable, references to specific related art and problems involved in the prior art which are solved by the applicant's invention. This item may also be titled "Background Art."
- (g) Brief Summary of the Invention: See MPEP § 608.01(d). A brief summary or general statement of the invention as set forth in 37 CFR 1.73. The summary is separate and distinct from the abstract and is directed toward the invention rather than the disclosure as a whole. The summary may point out the advantages of the invention or how it solves problems previously existent in the prior art (and preferably indicated in the Background of the Invention). In chemical cases it should point out in general terms the utility of the invention. If possible, the nature and gist of the invention or the inventive concept should be set forth. Objects of the invention should be treated briefly and only to the extent that they contribute to an understanding of the invention.
- (h) Brief Description of the Several Views of the Drawing(s): See MPEP § 608.01(f). A reference to and brief description of the drawing(s) as set forth in 37 CFR 1.74.

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- (i) Detailed Description of the Invention: See MPEP § 608.01(g). A description of the preferred embodiment(s) of the invention as required in 37 CFR 1.71. The description should be as short and specific as is necessary to describe the invention adequately and accurately. Where elements or groups of elements, compounds, and processes, which are conventional and generally widely known in the field of the invention described and their exact nature or type is not necessary for an understanding and use of the invention by a person skilled in the art, they should not be described in detail. However, where particularly complicated subject matter is involved or where the elements, compounds, or processes may not be commonly or widely known in the field, the specification should refer to another patent or readily available publication which adequately describes the subject matter.
- (j) Claim or Claims: See 37 CFR 1.75 and MPEP § 608.01(m). The claim or claims must commence on separate sheet or electronic page (37 CFR 1.52(b)(3)). Where a claim sets forth a plurality of elements or steps, each element or step of the claim should be separated by a line indentation. There may be plural indentations to further segregate subcombinations or related steps. See 37 CFR 1.75 and MPEP § 608.01(i)-(p).
- (k) Abstract of the Disclosure: See MPEP § 608.01(f). A brief narrative of the disclosure as a whole in a single paragraph of 150 words or less commencing on a separate sheet following the claims. In an international application which has entered the national stage (37 CFR 1.491(b)), the applicant need not submit an abstract commencing on a separate sheet if an abstract was published with the international application under PCT Article 21. The abstract that appears on the cover page of the pamphlet published by the International Bureau (IB) of the World Intellectual Property Organization (WIPO) is the abstract that will be used by the USPTO. See MPEP § 1893.03(e).
- (l) Sequence Listing. See 37 CFR 1.821-1.825 and MPEP §§ 2421-2431. The requirement for a sequence listing applies to all sequences disclosed in a given application, whether the sequences are claimed or not. See MPEP § 2421.02.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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7. Claims 1, 2, 6, 7, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (U.S. Patent No. 5,905,289) in view of Tomita et al. (U.S. Publication No. 2005/0035457).

In regards to claim 1, Lee discloses the following:

- a) a semiconductor substrate (10) (For Example: See Figure 12);
- b) one or more metallurgy layers connected to the semiconductor substrate, wherein each of the one or more metallurgy layers comprises one or more conductive lines (20 and 22) and one or more dummy structures (44) between the one or more conductive lines (For Example: See Figure 12); and
- c) one or more dielectric layers (48 and 46) between the one or more metallurgy layers (For Example: See Figure 12).

In regards to claim 1, Lee fails to disclose the following:

- a) dummy structures from different metallurgy layers are thermally connected.

However, Tomita et al. ("Tomita") discloses a semiconductor device that has dummy structures (29a and 15a) from different metallurgy layers that are thermally connected (28c) (For Example: See Figure 7). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Lee to include a semiconductor device that has dummy structures from different metallurgy layers that are thermally connected as disclosed in Lin because it aids in protecting against external noise (For Example: See Paragraph 8).

Additionally, since Lee and Tomita are both from the same field of endeavor, the purpose disclosed by Tomita would have been recognized in the pertinent art of Lee.

In regards to claim 2, Lee fails to disclose the following:

- a) there are at least two of the metallurgy layers that each include at least two of the dummy structures and wherein at least two of the dummy structures on a first metallurgy layer are connected to at least two of the dummy structures on a second metallurgy layers through a plurality of vias.

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However, Tomita discloses a semiconductor device that has dummy structures (29a) on a first metallurgy layer are connected to at least the dummy structures (15a) on a second metallurgy layer through a plurality of vias (28c) (For Example: See Figure 7). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Lee to include a semiconductor device that has dummy structures from different metallurgy layers that are connected through vias as disclosed in Lin because it aids in protecting against external noise (For Example: See Paragraph 8).

Additionally, since Lee and Tomita are both from the same field of endeavor, the purpose disclosed by Tomita would have been recognized in the pertinent art of Lee.

In regards to claim 6, Lee discloses the following:

a) the width of one of the one or more dummy structures is substantially the same as the width of the one or more conductive lines (For Example: See Figure 12).

In regards to claim 7, Lee fails to disclose the following:

a) at least two of the two dummy comprise different shapes.

However, Tomita discloses a semiconductor device where two dummy structures comprise different shapes (For Example: See Figure 6). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Lee to include a semiconductor device where two dummy structures comprise different shapes as disclosed in Lin because it aids in protecting against external noise (For Example: See Paragraph 8).

Additionally, since Lee and Tomita are both from the same field of endeavor, the purpose disclosed by Tomita would have been recognized in the pertinent art of Lee.

In regards to claim 9, Lee fails to disclose the following:

- a) at least two of the dummy structures comprise different sizes.

However, Tomita discloses a semiconductor device where two dummy structures comprise different sizes (For Example: See Figure 6). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Lee to include a semiconductor device where two dummy structures comprise different sizes as disclosed in Lin because it aids in protecting against external noise (For Example: See Paragraph 8).

Additionally, since Lee and Tomita are both from the same field of endeavor, the purpose disclosed by Tomita would have been recognized in the pertinent art of Lee.

In regards to claim 10, Lee fails to disclose the following:

- a) there are at least two of the dummy structures that are connected by a first line, wherein the width of the first line is less than the width of each of the two dummy structures.

However, Tomita discloses a semiconductor device where two dummy structures are connected by a first line, wherein the width of the first line is less than the width of each of the two dummy structures (For Example: See Figure 7). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Lee to include a semiconductor device where two dummy structures are connected by a first line, wherein the width of the first line is less than the width of each of the two dummy structures as disclosed in Lin because it aids in protecting against external noise (For Example: See Paragraph 8).

Additionally, since Lee and Tomita are both from the same field of endeavor, the purpose disclosed by Tomita would have been recognized in the pertinent art of Lee.



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8. Claims 3, 4 and 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (U.S. Patent No. 5,905,289) in view of Tomita et al. (U.S. Publication No. 2005/0035457) and *Microchip Fabrication* by Peter Van Zant.

In regards to claim 3, Lee fails to disclose the following:

a) at least one or more dummy structure comprises copper.

However, Van Zant discloses the use of copper (For Example: See Pages 400-401). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Lee to include the use of copper as disclosed in Van Zant because it is a better conductor (For Example: See Page 401).

Additionally, since Lee and Van Zant are both from the same field of endeavor, the purpose disclosed by Van Zant would have been recognized in the pertinent art of Lee.

In regards to claim 4, Lee fails to disclose the following:

a) at least one or more dummy structure comprises aluminum.

However, Van Zant discloses the use of aluminum (For Example: See Pages 398-399). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Lee to include the use of aluminum as disclosed in Van Zant because it aids in providing low resistivity (For Example: See Pages 398-399).

Additionally, since Lee and Van Zant are both from the same field of endeavor, the purpose disclosed by Van Zant would have been recognized in the pertinent art of Lee.

In regards to claim 11, Lee fails to disclose the following:

a) the first line comprises copper.

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However, Van Zant discloses the use of copper (For Example: See Pages 400-401). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Lee to include the use of copper as disclosed in Van Zant because it is a better conductor (For Example: See Page 401).

Additionally, since Lee and Van Zant are both from the same field of endeavor, the purpose disclosed by Van Zant would have been recognized in the pertinent art of Lee.

In regards to claim 12, Lee fails to disclose the following:

a) the first line comprises aluminum.

However, Van Zant discloses the use of aluminum (For Example: See Pages 398-399). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Lee to include the use of aluminum as disclosed in Van Zant because it aids in providing low resistivity (For Example: See Pages 398-399).

Additionally, since Lee and Van Zant are both from the same field of endeavor, the purpose disclosed by Van Zant would have been recognized in the pertinent art of Lee.

In regards to claim 13, Lee fails to disclose the following:

a) another two dummy structures are connected by a second line, wherein the first line and the second line comprise identical materials.

However, Tomita discloses a semiconductor device that has another two dummy structures that are connected by a second line, wherein the first line and the second line comprise identical materials (For Example: See Figure 6). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Lee to include a semiconductor device that has another two dummy structures are connected by a

second line, wherein the first line and the second line comprise identical materials as disclosed in Tomita because it aids in protecting against external noise (For Example: See Paragraph 8).

Additionally, since Lee and Tomita are both from the same field of endeavor, the purpose disclosed by Tomita would have been recognized in the pertinent art of Lee.

9. Claims 5, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (U.S. Patent No. 5,905,289) in view of Tomita et al. (U.S. Publication No. 2005/0035457) and Iguchi (U.S. Patent No. 6,225,697).

In regards to claim 5, Lee fails to disclose the following:

a) the distance between one the dummy structures and one of the one or more conductive lines is at least .1 um.

However, Iguchi discloses the distance between one the dummy structures and one of the one or more conductive lines is at least .1 um (For Example: See Figure 1 and Column 7 Lines 23-33). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Lee to include that the distance between one the dummy structures and one of the one or more conductive lines is at least .1 um as disclosed in Iguchi because it aids in reducing wire capacitance (For Example: See Column 7 Lines 23-33).

Additionally, since Lee and Iguchi are both from the same field of endeavor, the purpose disclosed by Iguchi would have been recognized in the pertinent art of Lee.

In regards to claim 19, Lee discloses the following:

a) a semiconductor substrate (For Example: See Figure 12);

b) one or more metallurgy layers connected to the semiconductor substrate wherein each of the one or more metallurgy layers comprises one or more conductive lines and one or more dummy structures between the one or more conductive lines (For Example: See Figure 12); and

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c) one or more dielectric layers between the one or more metallurgy layers (For Example: See Figure 12).

In regards to claim 19, Lee fails to disclose the following:

a) the distance between one the dummy structures and one of the one or more conductive lines is at least .1  $\mu\text{m}$ .

However, Iguchi discloses the distance between one the dummy structures and one of the one or more conductive lines is at least .1  $\mu\text{m}$  (For Example: See Figure 1 and Column 7 Lines 23-33). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Lee to include that the distance between one the dummy structures and one of the one or more conductive lines is at least .1  $\mu\text{m}$  as disclosed in Iguchi because it aids in reducing wire capacitance (For Example: See Column 7 Lines 23-33).

Additionally, since Lee and Iguchi are both from the same field of endeavor, the purpose disclosed by Iguchi would have been recognized in the pertinent art of Lee.

b) wherein at least two of the dummy structures on a first metallurgy layer are connected to at least two of the dummy structures on a second metallurgy layers through a plurality of vias.

However, Tomita discloses a semiconductor device that has dummy structures on a first metallurgy layer are connected to at least the dummy structures on a second metallurgy layer through a plurality of vias (For Example: See Figure 7). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Lee to include a semiconductor device that has dummy structures from different metallurgy layers that are connected through vias as disclosed in Lin because it aids in protecting against external noise (For Example: See Paragraph 8).

Additionally, since Lee and Tomita are both from the same field of endeavor, the purpose disclosed by Tomita would have been recognized in the pertinent art of Lee.

c) the dummy metal structures are connected by metal lines.

However, Tomita discloses a semiconductor device that has dummy structures connected by metal lines (For Example: See Figure 4). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Lee to include a semiconductor device that has dummy structures connected by metal lines as disclosed in Lin because it aids in providing a connection among the components (For Example: See Figure 4).

Additionally, since Lee and Tomita are both from the same field of endeavor, the purpose disclosed by Tomita would have been recognized in the pertinent art of Lee.

In regards to claim 20, Lee discloses the following:

a) the respective heights of the metal lines and the dummy metal structures are similar (For Example: See Figure 12).

10. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (U.S. Patent No. 5,905,289) in view of Tomita et al. (U.S. Publication No. 2005/0035457) and Landis (U.S. Publication No. 2004/0195670).

In regards to claim 8, Lee fails to disclose the following:

a) the two dummy structures comprise different materials.

However, Landis discloses two dummy structures (35 and 50) that comprise different materials (For Example: See Paragraphs 24 and 25). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Lee to include two dummy structures that comprise different materials as disclosed in Landis because it aids in reducing deflections (For Example: See Paragraph 3).

Additionally, since Lee and Landis are both from the same field of endeavor, the purpose disclosed by Landis would have been recognized in the pertinent art of Lee.

***Allowable Subject Matter***

11. Claim 14 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

12. Applicant's arguments filed 10/20/06 have been fully considered but they are not persuasive. First, Applicant argues that the "words heat and thermal do not appear anywhere within Lee, much less in association with dummy structures...the Office Action then turns to Tomita...Tomita's focus is (1) inhibiting the occurrence of resist poisoning and (2) providing protection against external electromagnetic noise...heat and thermal do not appear anywhere within Tomita much less in association with dummy structures...the particular problem with which Applicants were concerned and thus the field of Applicants' endeavor is heat dissipation within an integrated circuit...it is respectfully submitted that neither Lee nor Tomita is what the PTO considers to be analogous prior art." In response to applicant's argument, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). The fact that a reference does not disclose a particular word does not mean that the limitations are not disclosed. Tomita discloses a semiconductor device that has dummy structures (29a and 15a) from different metallurgy layers that are thermally connected (28c) (For Example: See

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Figure 7). In response to applicant's argument that the prior art is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, they are both from the same field of endeavor (semiconductors).

Finally, Applicant argues that the "only possible reason that the Examiner might believe there is a reasonable likelihood of success is that the Examiner is relying on hindsight of the success taught in Applicant's disclosure." In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

### ***Conclusion***

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica Lewis whose telephone number is 571-272-1838. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on 571-272-2429. The fax phone number for the organization

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where this application or proceeding is assigned is 571-273-8300 for regular and after final communications.

ML

March 24, 2007

A handwritten signature in black ink, appearing to be 'ML' with a stylized flourish.

**MONICA LEWIS**  
**PRIMARY PATENT EXAMINER**